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THE GENUS OTHAKE RAF.

B. F. BUSH.

Issued June 8, 1904.

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THE GENUS OTHAKE RAF.*

B. F. BUSH.

While going over some specimens of *Polypteris* collected in Texas by Mr. J. Reverchon about a year ago, I felt convinced that there were more than three annual species in the collection, and began a study of the genus to ascertain just what species the specimens under consideration represented, which study has been continued as my spare time permitted, up to the present.

Through the courtesy of Prof. Wm. Trelease and Mr. Richard Rathbun, I have been enabled to make a careful examination of all the material of the species generally referred to this genus in the herbarium of the Missouri Botanical Garden and that of the United States National Herbarium,† and I have concluded that it is better to treat the species of the Southwestern United States as a separate genus from the Southeastern plant on which Nuttall founded the genus *Polypteris*.‡

As it became apparent to me that the annual species, of which *Stevia callosa*§ may be taken as the type, must bear another name, I began to examine the synonymy of *Polypteris* to ascertain if anyone had described the species under a separate name.

The earliest name to be applied to this group of plants appears to have been given by Rafinesque, who in the New Fl. Am. 4 : 73, 1836, takes up the *Stevia callosa* of Nuttall

* Presented by title before The Academy of Science of St. Louis, May 2, 1904.

† For the sake of convenience, I have used the letters M and N to signify specimens from the herbarium of the Missouri Botanical Garden, and the United States National Herbarium respectively.

‡ Nuttall, Gen. 2 : 139. 1818.

§ Nuttall, Journ. Acad. Philad. 2 : 121. 1821.

under the name *Othake*. As Rafinesque's New Flora is an exceedingly rare book, I append his original description.

"*OTHAKE* Raf. diff. *Stevia*, perianthe turbinate sub 8 flos, segments about 8-nervose, florets with slender tube, limb as long, 5-parted, anthers subsessile, style elongate, hispid, stigmas revolute, seeds elongate, as long as perianth, obverse pyramidal, 4-gone, awned by 8 teeth, or short scariose scales, annuals, leaves alternate and callose, flowers paniculate, incarnate. This G. is perfectly distinct by the perianthe, deep cut florets, scaly crown, leaves, &c. The name means warty apex, the leaves ending in obtuse callosity.

"928. *Othake tenuifolium* Raf. *Stevia callosa* Nutt. Stem terete, fur-furescent, glandular above, leaves narrow linear, thickish, with appressed hairs, panicle dichotome multiflore lax divaricate — in Arkansas: pedal leaves uncial often with fascicles at the axils, flowers on long naked peduncles; the segments of the florets narrow, long linear, acute, segments of perianthe cuneate, acuminate."

Rafinesque in the above clearly refers Nuttall's *Stevia callosa* to his new genus, but unfortunately replaces Nuttall's name by one of his own, which cannot be retained for the species. Rafinesque also describes a second species of *Othake* under No. 924, which he says was collected in Arkansas also by Nuttall, but I have been unable to identify it from his meager description. The only points, in the description of this second species, which are significant, are the broader and longer leaves, the lower of which are often opposite.

After a very careful study of all the species that are commonly included in the genus *POLYPTERIS*, I unhesitatingly offer the following arrangement: —

Perennial; bracts of the involucre more imbricated and scarious, glabrous; corolla with the base of 5-parted limb forming a short campanulate throat: Southeastern United States. 1. *POLYPTERIS* Nuttall.

Annual; bracts of the involucre few-imbricated, herbaceous up to the sphacelate colored tips, pubescent or glandular; corolla 5-parted nearly down to the slender tube: Southwestern United States and Mexico. 2. *OTHAKE* Rafinesque.

1. *POLYPTERIS* Nutt. Gen. 2: 139 (1818).

One species only, *P. integrifolia* Nuttall, l. c. of the Southeastern United States.

2. OTHAKE Rafinesque, New Fl. Am. 4 : 73 (1836).

Stevia Nuttall, Journ. Acad. Philad. 2 : 121 (1821), not *STEVIA* Cav. Ic. 4 : 32. t. 354-356 (1797).

Palafozia DC. Prodr. 5 : 124 (1836), not *PALAFOXIA* Lag. Nov. Gen. & Spec. 26, 181 (1816).

Florestina DC. Prodr. 5 : 655 (1836), not *FLORESTINA* Cass. Bull. Philom. 1815, and Dict. 17 : 155. t. 86 (1820).

Palafozia T. & G. Fl. N. A. 2 : 368, 369 (1842), not of Lag. Nov. Gen. & Spec. 26, 181 (1816).

Polypteris Gray, Proc. Am. Acad. 19 : 30 (1883), not *POLYPTERIS* Nuttall, Gen. 2 : 139 (1818).

Erect, rough, glandular, canescent or cinereous branching annual herbs, with alternate, mostly entire leaves, or the lower opposite and slenderly petioled, and corymbose or paniculate, pedunculate heads of tubular, or both tubular and radiate pink or rose-purple flowers. Involucre campanulate or obconic, its bracts in 1 or 2 series, narrow, herbaceous, nearly equal, or with a few exterior shorter ones, appressed, usually colored, at least at the narrow sphacelate tips. Receptacle small, flat, naked. Ray-flowers, when present, pistillate, fertile, the rays 3-cleft, but sometimes abortive or wanting. Disk-flowers perfect, fertile, their corollas with slender tubes and deeply 5-parted campanulate limbs. Anthers entire or emarginate at the base. Style-branches filiform, acutish, glandular-pubescent throughout. Achenes linear or narrowly obpyramidal, quadrangular, usually pubescent or hairy. Pappus of 6-12 lanceolate, often strongly costate scales, that of the outer achenes as numerous, often much shorter, oblong or spatulate, obtuse, erose or fimbriate. Southwestern North American scabrous-pubescent, annual herbs, penetrating Mexico, flowering spring, summer and autumn.

The species fall naturally into two sections, the first with homogamous heads containing one-half of the species, not considering the Mexican species, which may here be mentioned as OTHAKE LINDENII, the *Polypteris Lindenii* of Gray, Pl. Wright. 1:120, 1852, and the second section with heterogamous heads, containing the remainder. For the North American species I offer the following: —

ANALYSIS OF SPECIES.

Heads homogamous, middle-sized or small, 4-8 mm. high; involucre turbinate; achenes much broadened upward, 3-6 mm. long.

Stems zigzag, slender, much branched, the branches widely diverging, whitish, glaucous; leaves very narrow, linear, 1-nerved, thickish; heads smallest, flowers flesh-colored; peduncles short, slender, densely glandular.

1. OTHAKE CALLOSUM.

Stems straight, slender, few-branched, branches ascending; leaves broader, linear-lanceolate, 1-nerved; heads somewhat larger, more numerous flowered, flowers bright rose-colored; peduncles very slender, longer, scabrous and glandular.

2. OTHAKE ROSEUM.

Stem stout, straight, little branched, branches ascending; leaves broadest, ovate-lanceolate, thin, 3-nerved; heads large, many-flowered, flowers rose-purple; peduncles short, stout, somewhat glandular.

3. OTHAKE TEXANUM.

Heads heterogamous, middle-sized or large, 1-2 cm. high; involucre obconic; achenes slender, linear, scarcely broadened upward, 4-8 mm. long; bracts of the involucre hispid and glandular.

Heads largest; involucre bracts 1 cm. or less long; leaves indistinctly 3-nerved, lower opposite; peduncles very stout, densely scabrous-pubescent.

4. OTHAKE HOOKERIANUM.

Heads middle-sized; involucre bracts 1-2 cm. long or longer; leaves all alternate, distinctly 3-nerved; plants densely glandular all over; peduncles stout.

5. OTHAKE MAXIMUM.

Heads smaller; involucre bracts shorter; leaves smoother, indistinctly 3-nerved; plants minutely scabrous or nearly smooth; peduncles long, very slender, diverging, sparingly glandular.

6. OTHAKE REVERCHONI.

1. OTHAKE CALLOSUM (Nutt.) Bush.

Stevia callosa Nutt. Journ. Acad. Philad. 2: 121 (1821).

Florestina callosa (Nutt.) D.C. Prodr. 5: 655 (1836).

Othake tenuifolium Raf. New Fl. Am. 4: 74 (1836).

Palafoxia callosa (Nutt.) T. & G. Fl. N. A. 2: 369 (1842).

Polypteris callosa (Nutt.) Gray, Proc. Am. Acad. 19: 30 (1883).

Stems slender, widely much branched, appressed strigose-pubescent, glandular above, 2-6 dm. high. Leaf-blades very narrow, linear, thickish, obtuse or acutish, rough on both sides, the upper alternate, the lower opposite and short-petioled, 1-nerved, the edges revolute, 2-5 cm. long, 1-3 mm. wide, the upper gradually reduced. Involucre campanulate, 3-4 mm. high, its bracts linear, 3-4 mm. long, appressed, canescent, eglandular or rarely glandular, in two series, both

much alike, the inner but little colored. Peduncles slender, short, densely stalked-glandular; ray-flowers none; disk-flowers 5-12, perfect, fertile, 5-parted nearly to the filiform tube, flesh-colored; achenes 3-4 mm. long, narrowly obpyramidal, angular, pubescent or rarely glabrous; pappus-scales 6-8, obovate or spatulate, erose or dentate, about 1 mm. long, the costae scarcely reaching the apices. — Rocky barrens and plains, Missouri and Arkansas to Texas and New Mexico. Autumn.

Specimens examined: MISSOURI: Marble Cave, *Trelease*, September 11, 1898 (M); Swan, *Bush* 476, September 24, 1899 (M N); *Trelease*, October 9, 1899 (M); Greene County, *Bush* 203, September 4, 1893 (M N); Eagle Rock, *Bush* 115, September 17, 1896 (M N); *Mackenzie*, September 17, 1896 (M). ARKANSAS: Eureka Springs, *Wislizenus*, August, 1887. TEXAS: Dallas, *Bush* 1635, October 30, 1900 (M); 1146, September 26, 1900 (M); *Hall* 356, June 30, 1872 (M N); *Reverchon* 3288, October 16, 1902 (M); 526, August, 1882 (N); Southwest Texas, *Palmer* 656, September, 1879, to October, 1880 (N); Fort Worth, *Ward*, September 9, 1877 (N); *Bodin* 96, July, 1889 (N); Glen Rose, *Ward*, October 10, 1891 (N); Comanche Peak, *Reverchon* 3655, September 6, 1903; Weatherford, *Tracy* 8142, October 18, 1902 (M); Parker County, *Broadhead*, date of collection not given (M); Willow Creek, *Jermy* 804, date not given (M N); Kerrville, *Heller* 1919, June 26 to 30, 1894 (N); Valley of the Rio Grande, below Dona Ana, New Mexico, *Mexican Boundary Survey* 613 (N); Western Texas, *Wright* 377, May to October, 1849 (N). NEW MEXICO: No locality, *Wright* 1410, 1851-52 (N).

2. OTHAKE ROSEUM Bush.

Stems erect, simple or few-branched, branches ascending, scabrous-pubescent, 4-7 dm. high. Leaf blades linear-lanceolate, entire, acute or acuminate, narrowed at the base, rough on both sides, the upper alternate, the lower opposite and short petioled, 2-5 cm. long, 2-5 mm. wide, 1-nerved, the upper gradually reduced. Involucre campanulate, 6-9 mm.

high, its bracts 5–7 mm. long, hispid and glandular, in two series, the outer more herbaceous, and colored only at the tips, the inner deep purple for at least the upper half. Peduncles slender, ascending, scabrous-pubescent and glandular; ray-flowers none; disk-flowers numerous, perfect, fertile, 5-parted nearly to the filiform tube, bright rose-colored, pubescent on the inner surface near the apices; achenes 3–4 mm. long, scarcely 1 mm. thick, linear, slightly broadened upward, pubescent; pappus-scales 6–8, lanceolate, acute, more than one-half the length of the achene, those of the marginal flowers spatulate, obtuse, shorter, strongly costate, the costae not reaching the tips, all densely pubescent. — Sandy prairies and woods, Eastern Texas and Indian Territory. Summer and autumn.

Specimens examined: TEXAS: Sheldon, 18 miles east of Houston, *Reverchon* 3656, October 7, 1903, type (M); Houston, *Bush* 1599, October 25, 1900 (N); Columbia, 50 miles south of Houston, *Bush* 1387, October 7, 1900 (MN); Brazos County, *Pammel*, July 1888 (M); Dallas, *Glatfelter*, June 16, 1898 (M); *Reverchon* 1507, date of collection not given (N); 3290, May 1, 1902 (M); Galveston Bay, *Joor*, September 26, 1884, in part, the larger plant (M); Laredo, *Pringle* 2655, July 24, 1889 (M); Millett, *Trelease*, November 4, 1897 (M); no locality, *Lindheimer* 106, 1843 (M); Hockley, *Thurrow* 12, 1890 (N); Austin, *Letterman*, August, 1882 (N); Industry, *Wurzlöw* 35, 1894 (N); Cherokee, Rusk County, *Joor*, October 31, 1884, in part, the larger plant. INDIAN TERRITORY: Canadian River, *Bigelow*, 1853–54 (N).

3. OTHAKE TEXANUM (DC.) Bush.

Palafoxia Texana DC. Prodr. 5: 125 (1836).

Polypteris Texana (DC.) Gray, Proc. Am. Acad. 19: 31 (1883).

Stems stout, dichotomously branched, hispid or scabrous-pubescent, slightly viscid above, 2–6 dm. high. Leaf-blades lanceolate or ovate-lanceolate, entire, obtuse, rounded at the base, rough on both sides, the upper alternate, the lower opposite and slender-petioled, 2–5 cm. long, 10–25 mm. wide,

the upper much reduced, distinctly 3-nerved. Involucre campanulate, 6–12 mm. high, its bracts 5–10 mm. long, linear, hispid or canescent, in two series, the outer nearly herbaceous, the inner thinner and with rose-colored tips. Peduncles erect, stout, short, densely scabrous and somewhat glandular; ray-flowers none; disk-flowers numerous, perfect, fertile, 5-parted nearly to the filiform tube, rose-colored; achenes 5–7 mm. long and about 1 mm. thick, narrowly obpyramidal, quadrangular, pubescent; pappus-scales 6–8, short-ovate, obovate or spatulate, erose or fimbriate, very short. — Sandy woods and prairies, Indian Territory to Texas and Mexico. Spring, summer and autumn.

Specimens examined: INDIAN TERRITORY: Quanah's Ranch, *Sheldon* 197, July 25, 1891 (N). TEXAS: Laredo, *Reverchon* 3657, March 26, 1903 (M); *Mackenzie* 7, August, 1899 (M); Pena Station, near Laredo, *Havard*, August, 1884 (N); Southwestern Texas, near Laredo, *Palmer* 642, September, 1879, to October, 1880 (M N); Corpus Christi Bay, Nueces County, *Heller* 1562, April 9 to 12, 1894 (M N); Nuecestown, *Marlatt*, April 27, 1896 (N); Millett, *Trelease*, November 5, 1897 (M); Eagle Pass, *Havard* 56, date of collection not given (N); Valley of the Rio Grande, below Dona Ana, New Mexico, *Mexican Boundary Survey* 614, in part, two sheets of this collection, the smaller plant on each sheet (N). MEXICO: Monterey, *Pringle* 1919, July 4, 1888 (N); Coahuila and Nuevo Leon States, *Palmer* 645, February to October, 1880 (N); Tampico, Tamaulipas, *Pringle* 6354, April 4, 1896 (M).

4. OTHAKE HOOKERIANUM (T. & G.) Bush.

Othake longifolium Raf. New Fl. Am. 74 (1836). (?)

Palafoxia Texana Hook. Ic. Pl. t. 148 (1837), not of DC. Prodr. 5: 125 (1836).

Palafoxia Hookeriana T. & G. Fl. N. A. 2: 368 (1842).

Polypteris Hookeriana (T. & G.) Gray, Proc. Am. Acad. 19: 31 (1883).

Stems stout, branched, hispid, glandular-pubescent and viscid above, 2–6 dm. high. Leaf-blades linear-lanceolate, entire, acute or acuminate, narrowed at the base, rough on both sides, the upper alternate, the lower opposite and

slender petioled, 3–10 cm. long, 6–10 dm. wide, the upper gradually reduced, indistinctly 3-nerved. Involucre obconic, or cylindrical, 10–25 mm. high, its bracts 6–15 mm. long, linear, glandular, in two series, the outer looser and often wholly herbaceous, the inner with purplish tips. Peduncles erect, stout, short, densely scabrous-pubescent and glandular; ray-flowers 8–10, pistillate, fertile; rays rose-purple, deeply 3-cleft, 1–2 cm. long, sometimes small or none; disk-flowers numerous, perfect, fertile, 5-parted nearly to the filiform tube, purplish; achenes 6–8 mm. long and about 1 mm. thick, linear, very pubescent; pappus-scales of the disk-flowers 6–8, lanceolate, awned by the excurrent costae, more than half the length of the achene, those of the ray-flowers as many, spatulate, obtuse, very short. Sandy plains and prairies, Nebraska and Kansas to Texas, New Mexico, Colorado and Mexico. Summer and autumn.

As this is the only other species Nuttall collected in Arkansas, it may be inferred that this is the *Othake longifolium* of Rafinesque. If such should prove to be the case, Rafinesque's name is some six years earlier than that of Torrey and Gray.

Specimens examined: KANSAS: American plains, Lat. 40, Hall, 1864 (M N); Caldwell, Carleton, 340, July, 1891 (N); Smyth 271, September 10, 1890 (N); Arkalon, Kellerman 4, June 28, 1888 (N); Carleton, October 23, 1892 (N); Garden City, Smyth 171, August 20, 1890 (N); Hamilton County, Hitchcock 288, August 3, 1895 (M N); Syracuse, Thompson 76, July 4, 1893 (M N). INDIAN TERRITORY: Cimarron River, Mark White 152, 250, July 12, 1899 (M); on the False Washita, Palmer 446, 1868 (N); on the Canadian River, Bigelow, 1853–54 (N). COLORADO: Greeley, Ward, August 3, 1881 (N); no locality, Parry 352, 1864 (N). NEW MEXICO: Mesilla, Donna Ana County, Wooton 28, June 17, 1897 (M N); Las Cruces, Wooton, August 22, 1893 (N); G. R. Vasey, 1881 (N); Roswell, Earle 381, August, 1900 (N); no locality, Wright 1250, 1851–52 (N). TEXAS: Millett, Trelease, November 5, 1897 (M); Milano, Joor 54, October 28, year not given (M); Big Springs, Tracy

872, May 11, 1902 (M); Corpus Christi Bay, Neueces County, *Heller* 1562, April 9–12, 1894 (M); Hueco Tanks, *Mulford* 136, July 2, 1895 (M); Southwestern Texas, *Palmer* 655, September, 1879, to October, 1880 (N); Odessa, *Havard*, September, 1881 (N); no locality, *Havard*, September, 1881 (N); El Paso, *Wright* 375, October, 1849 (N); Valley of the Rio Grande, below Dona Ana, New Mexico, *Mexican Boundary Survey* 615, three sheets of this collection and number (N); same locality and collection, *Mexican Boundary Survey* 614, in part, two sheets of this number, the larger plant on each (N). MEXICO: Paso del Norte, Chihuahua, *Pringle* 761, September 20, 1886 (N).

5. OTHAKE MAXIMUM (Small) Bush.

Polypteris maxima Small, Fl. Southeastern U. S. 1288 (1903).

Stems stout, simple below, few branched above, densely hispid-scabrous and glandular throughout, 8–10 dm. high. Leaf-blades linear-lanceolate, entire, acute or acuminate, narrowed at the base, rough on both sides, all alternate, 5–10 cm. long, 1–2 cm. wide, the upper gradually reduced, distinctly 3-nerved. Involucre campanulate, 1–2.5 cm. high, its bracts 1–2 cm. long, linear, densely white-hispid and glandular, in two series, the outer wholly herbaceous, the inner thinner and somewhat colored at the tips. Peduncles ascending, stout, densely hispid and glandular; ray-flowers 8–12, pistillate, fertile; rays purplish or rose-colored, deeply 3-cleft, 1–2 cm. long; disk-flowers numerous, perfect, fertile, 5-parted nearly to the filiform tube, purplish or rose-colored; achenes 6–8 mm. long, scarcely 1 mm. thick, linear, quadrangular, hairy; pappus-scales of the disk-flowers 6–8, lanceolate-awl-shaped, awned by the excurrent costae, very pubescent, as long as the achene itself or longer, those of the ray-flowers as many, similar and but little shorter.—Southern Texas. Autumn.

Specimens examined: TEXAS: Industry, *Lindheimer* 266, August, 1844 (M N).

6. OTHAKE REVERCHONI Bush.

Stems nearly simple, sparingly appressed-pubescent, few-branched, the branches very slender, short-pubescent or glabrate, widely diverging, 4–8 dm. high. Leaf-blades linear-lanceolate, entire or slightly undulate, acute or acuminate, narrowed at the base, minutely scabrous on both sides, the upper alternate, the lower opposite and manifestly petioled, 3–6 cm. long, 3–6 mm. wide, the upper gradually reduced, distinctly 3-nerved. Involucre obconic, 8–12 mm. high, its bracts 6–10 mm. long, loosely pubescent and glandular, in two series, linear, the outer looser and herbaceous, the inner purplish colored. Peduncles very slender, terminating slender diverging branches, pubescent and sparingly glandular; ray-flowers 3–6, pistillate, fertile; rays rose-colored, 1–1.5 cm. long, deeply 3-cleft; disk flowers 3–6, perfect, fertile, 5-parted nearly to the filiform tube, purplish; achenes 4–5 mm. long, scarcely 1 mm. thick, linear, angled, hairy; pappus-scales of the disk-flowers 6–8, narrowly lanceolate, 4–5 mm. long, about as long at the achene, the mid-vein extending into a long rough cuspidate point, those of the ray-flowers as many, oblong-spatulate, 1 mm. long, erose or dentate at the tips. — In dry sands, Eastern Texas. Autumn.

Specimens examined: TEXAS: Big Sandy, Upshur County, *Reverchon* 3289. September 16, 1902, type (M); Cherokee, Rusk County, *Joor*, October 3, 1884, in part, the smaller plant (M); Evergreen, Harris County, *Joor*, September 26, 1884, in part, the smaller plant (M).

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